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# PED - Is UK Compliance Under Pressure?

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## Why you should attend

- Understand how the PED, Pressure Equipment Regulations and Pressure Equipment (Safety) Regulations apply in the UK for imports, equipment and installations
- Take part in a discussion on how to improve understanding of conformity and certification requirements during construction and installation
- Consider potential opportunities to improve UK legislation in the future

## Introduction

The UK has left the EU but retained many EU derived Laws and Regulations. The current Pressure Equipment (Safety) Regulations 2016 were derived from the EU Pressure Equipment Directive and the UK Pressure Systems Safety Regulations 2000 for in-service pressure equipment were published to coincide with the original UK implementation of the EU PED, the Pressure Equipment Regulations 1999. The primary purpose of this paper is to consider the impact of the PED; the opportunities we may have for improvement and the potential for modification now the UK is independent of EU legislation and has to consider the most appropriate mechanism for the UK.

## What did the PED change?

The Pressure Equipment Directive (PED) 97/23/EC was implemented in the UK through the Pressure Equipment Regulations 1999 S.I. 1999/2001, coming into effect in November 1999. Prior to this, the sale of pressure equipment in the UK was largely unregulated, lacking structured requirements for design appraisal or verification during manufacture to ensure compliance with specifications.

In a 1992 interview with the editor of the Refrigeration and Air Conditioning magazine, one of the co-authors of this paper noted that international construction codes were generally accepted in the UK, allowing overseas manufacturers unrestricted access to the home market. Conversely, UK manufacturers faced significant technical trade barriers that hindered their ability to export competitively. The introduction of the PED was anticipated to address these disparities by creating a European Regulation with supporting standards that would provide a level playing field for manufacturers of pressure vessels and other pressure equipment.

One of the anticipated standards, EN 13445 - Unfired Pressure Vessels, was eventually issued in 2002, five years later than was expected in 1992 and just in time for the end of the two-year transition period when the PED was in co-existence with National Regulations. In the interim, manufacturers choosing to comply with the new Regulation, adhered to existing standards and codes to meet the Essential Safety Requirements (ESRs) stipulated by the PED. The PED introduced a system for categorising equipment hazards and mandated design approval and surveillance during manufacture, which had previously not been a statutory requirement. In 1992 such oversight was typically only demanded by sophisticated end users, such as those in the petrochemical industries.

## Explanation of where we are now, PED v PE(S)R what are the pressure equipment certification requirements in the UK.

In 2014 the PED was changed to the Pressure Equipment Directive 2014/68/eu bringing it into alignment with the EC's New Legal Framework under article 114 of the Treaty of Rome, whereas 97/23/EC was under article 100a. The main driver being the legislative alignment, replacement of fluid grouping method by the Classification, Labelling and Packaging Regulations were also addressed together with update of references to other applicable EU Directives and the clarification of role definitions as European Economic Operators. While there were no technical changes to the Scope, Hazard Category Tables, or ESRs an obligation was introduced for manufacturers to analyse the risks of pressure equipment as well as the hazards. Consequently, the UK Pressure Equipment Regulations were repealed and replaced by the Pressure Equipment (Safety) Regulations 2016 (PE(S)R) S.I 2016/1105. The EU withdrawal Act 2018 preserved the PE(S)R and enabled them to be amended introducing among other things the concept of UKCA marking and Designated Standards these being technical specifications adopted by a recognised standardisation body. For example, BS EN 378-2:2016 Refrigerating systems and heat pumps. Safety and environmental requirements. Design, construction, testing, marking and documentation which is both a designated standard and harmonised against the PED. A much-revised draft for review of Part 2, will be published later this year meaning the final version will go out for vote in May 2026 and likely published in November 2026.

The exit from the EU and the initial UK Government intention to mandate a single UKCA marking route for equipment led to some initial confusion over how to obtain fully UKCA compliant materials and qualifications. Subsequently the government has laid legislation to continue recognition of EU requirements for a range of product regulations, including the CE marking (Conformité Européenne, or European Conformity marking) for a range of products. This means businesses will have the flexibility to use either the UKCA (UK Conformity Assessed) or CE marking to sell products in Great Britain (GB). Legislation can be found The Product Safety and Metrology etc. (Amendment) Regulations 2024 S.I. 696. Continued recognition of EU requirements does not apply to regulations for medical devices, construction products, marine equipment, rail products, cableways, transportable pressure equipment, and unmanned aircraft systems regulations. There are specific arrangements in place for these sectors. This means that where a contractor is involved with other Regulations, particularly construction products and transportable pressure equipment for the refrigeration industry, the recognition of EU requirements and markings must not be assumed.

The UK Government extension of recognition of CE marking will continue indefinitely (or until technical divergence), and UK product safety regulations remain aligned with EU product safety law. Meaning that either UKCA or CE marking are currently recognised in the UK. The manufacturer must determine whether the conformity assessment will follow UKCA or CE marking requirements, although both can be applied, before engaging an independent third party to assess products against the essential safety requirements. UK approved bodies are authorised only to assess equipment for UKCA marking, whereas EU Notified Bodies are limited to assessing for CE marking. For the qualification of personnel conducting permanent joining or non-destructive testing under UKCA marking, a competent approved body, Notified Body, or Recognised Third-Party Organisation (RTPO) based in the UK, or the European Economic Area (EEA) may be utilised. In cases where CE marking is employed, these activities must be performed by a Notified Body or RTPO situated in the EEA. This also raises questions around assemblies made in UK for use in the UK (and whether an EU notified body is best placed to operate in a UK only situation as the UK is a third Country under EU Law and their notification.

If importing CE marked pressure equipment it is a requirement that the importers contact details are provided. It is crucial to note that, should a UK company import CE marked equipment or components for use in an assembly of their manufacture or onward distribution and a breach of regulations is discovered, the Health and Safety Executive is unlikely to pursue action against the overseas supplier. Instead, accountability would lie with the UK importer.

Additionally the UK PE(S)R as amended by SI 696 requires the instructions for use and other documentation to be in English, or translated into English a duty which may also fall on the importer. Of course, the provenance of the marking (CE or UKCA) must be verified by the entity placing on the UK market and in cases where the CE mark is suspect, redress via the EU will likely be problematic unless the identical (suspect) product has also been placed on the EU market.

## Examples – of Refrigeration Air Conditioning and Heat Pumps Systems (RACHP)

The route to hazard classification for RACHP systems are identical. All are classified based on fluid characteristics, allowable pressure, and component volumes or DN as appropriate. Despite variations in allowable pressures and fluids, the global conformity assessment of system assemblies would be categorised by the component with the highest hazard category, usually the liquid receiver or oil separator. Interconnecting piping in a RACHP system, with the exclusion of an ammonia plant, was rarely above category 1. However the uptake of refrigerants in Safety Groups A3 and A2L which are group 1 fluids changes this. For example, R32 (safety group A2L) is a PED group 1 fluid. In a system with a PS of 40 Barg, as may be encountered in a heat pump any piping above 1.3/8" diameter will be classified as category II. This requires both permanent joining (brazing) procedures and operators to be qualified by NoBo or RTPO and to a recognised standard such as BS EN 14276. Additionally the derogation afforded by BS EN 378 part 2 clause 6.3.2 allowing a strength test pressure of 1.1 x PS does not apply and a test at 1.43 x PS is required or additional measures. Of course, a catastrophic failure at 44 Barg can still be devastating but the consequences of a test at 57.2 Barg even more so. Although a Hazard and Operability (HAZOP) study for comparable RACHP Systems will identify different control measures to mitigate risk, the PE(S)R hazard categorisation remains the same. The intended use or purpose of the equipment does not influence the conformity assessment.

However, PED Guideline B-04 related to PED Article 2 (3) regarding the classification of heat exchangers made from straight or bent pipes may, as an exception, be considered as piping, under the condition that they are used in refrigeration systems, air conditioning systems, or heat pumps.

## Look at the PSSR as a vehicle to certify pressure equipment assemblies instead of PE(S)R?

The UK Pressure Systems Safety Regulations 2000 allow for new equipment in Regulation 4 and marking in Regulation 5. This is to address the situation where the PSSR applies and the PE(S)R does not apply. In particular the use of the PSSR for assemblies assembled on the site of a user. The PSSR provisions are simply worded and require that systems must be designed and constructed ensuring they are of adequate strength and quality. In effect the regulatory expectation is that the PE(S)R is complied with, however as the PSSR recognises repairs, minor modifications and if the PE(S)R excludes conformity assessment of assembly on site under the user's responsibility then the PSSR is the vehicle where PE(S)R has excluded itself. In reality this will not result in a return to the pre-PED days described earlier. The Competent Person under PSSR will still expect evidence of appropriate design, controlled and traceable manufacture and testing to demonstrate strength and quality of work. What the PSSR does allow is focus on appropriateness to the context, meaning that as the EU

rules and guidelines are not required, equivalent measures for safety of the systems can be introduced that may not enable free movement of the items in the EU.

Assemblies under the PE(S)R require each item of pressure equipment to be conformity marked (CE or UKCA) where the item is available individually. If the items are “placed on the market” as a completed assembly, then one Declaration of Conformity and one conformity marking can be applied. This does mean that the individual items would not be suitable for onward sale or use outside of the original, complete assembly they form part of.

## PEDG Guidance – developed by the Pressure Equipment Consultation Forum.

A group of specialists, under the sponsorship of the Pressure Equipment Consultation Forum (PECF) have produced several UK guides for pressure equipment assemblies. These are published by both EEMUA and SAFED and are free to download from their respective online libraries. The documents are:

### PEDG1/EEMUA 237 (edition 2):

provides guidance to manufacturers when assembly takes place on users' sites, ensuring Written Schemes of Examination (WSE) can be certified before use.

### PEDG2/EEMUA 245:

provides practical advice on how legal compliance should be demonstrated where on-site manufacture and assembly of pressure equipment are undertaken under the direct control of the intended user of the equipment. It has been created to help a range of stakeholders (including designers, purchasers, installation contractors and users) understand the roles and activities when assembling pressure equipment on site.

### PEDG3/EEMUA 248

to aid stakeholders in the process of transfer of knowledge from those responsible for the manufacture of equipment, assemblies and systems to the User/Owner and Competent Person, who are responsible under the Pressure Systems Safety Regulations 2000 (PSSR) for a Written Scheme of Examination (WSE).

A fourth document is expected to be published in 2025. This will focus on the EU PED guidelines, specifically those that the UK Competent Authority originally drafted, or was instrumental in producing. The document will consider the UK context and highlight any differences between UK and mainland European expectations.

## Is So Far As Reasonably Practical (SFAIRP) a solution to address hazards?

Whether SFAIRP (So Far As Is Reasonably Practicable) is the best solution depends on the specific context and industry requirements. In the refrigeration industry, SFAIRP is often considered a robust approach for managing risks because it ensures that all reasonable measures are taken to minimize hazards without incurring disproportionate costs

- Cost vs. Benefit: The principle of SFAIRP involves evaluating whether the cost of additional safety measures is grossly disproportionate to the benefit gained.
- Industry Standards: Adhering to industry standards and best practices can help demonstrate that SFAIRP has been achieved

In practise, the approach will assess the likely hazards such as over/under pressure; temperature control, leaks and expected failure modes. The mechanisms of training, competence, maintenance, operating conditions,

safety equipment will be used to mitigate or eliminate the identified hazards and then the residual hazards assessed against the SFAIRP criteria. Such an approach requires communication and ongoing assessment for viability – changing the maintenance regime may affect the mitigation originally envisaged, either positively or may adjust the reasonably practicable argument.

## What we could do to make the whole thing better (Create a different, trade focused legislation, not EU focused).

Following the UK's decision to determine its own position on the world stage, the opportunities for the pressure equipment industry were somewhat overlooked. The focus was very much on maintaining the pre-BREXIT arrangements with as little disruption as possible. Whilst this was beneficial in the short term, a longer-term view should be considered. CE marking is a trade arrangement, and providing certainty is important to safeguard growth in the UK, while maintaining adequate levels of safety. Any recommendation would not seek to remove CE marking from the UK. Instead consideration to introduce a choice in that: where CE marking has been applied, the UK requirements will be met, and where CE marking has not been applied, an equivalent level of safety and suitability must be met in order to address the UK regulations. This means that the UK regulations may, in time, come to recognise other national safety rules, such as the US National Board, ASME code certification marking, the Indian Boiler Regulations, the Japanese High Pressure Gas Control Law, where suitable trade relationships have been established, mutual recognition made and an equivalent level of safety has been demonstrated. This was the focus of an IMechE paper published in January 2019 *(Pressure Equipment And CE Marking: Impact And Opportunities Of Brexit)*

## Non Compliance

Instances of end users affected by non-compliance have been known to result in serious consequences for all parties involved. In one case, an end user attempted to replicate a system installed elsewhere by sourcing imitation components from around the world that were falsely represented as CE compliant. Fortunately, a diligent refrigeration contractor was employed to assemble and commission the system. The contractor discovered that these components were substandard, leading to significant delays and costs. Consequently, much of the system had to be scrapped, and the contractor was instructed to restart the project. Had the contractor followed the user's instructions without scrutiny, compliance with the Pressure Systems Safety Regulations (PSSR) would have been unattainable, as any competent person would have refused to provide a Written Scheme of Examination (WSE).

In another instance, the requirements of the Pressure Equipment Directive (PED) during the construction phase were overlooked. Contractors tried to retrospectively comply with the directive for what was now an operational system, which should not have been functioning due to the absence of a WSE. This oversight severely impacted the plant's operations, resulting in downtime, lost supply contracts, significant expenses, and reputational damage.

Experience indicates that industrial refrigeration contractors and those operating nationwide in the retail food sector are generally aware of both the PED and PSSR, although there can sometimes be confusion about who the duty holders are. Smaller commercial refrigeration contractors and companies installing systems such as split air conditioning and heat pump systems often do not realise that they are considered the manufacturers of the systems they place on the market, unless stated otherwise in contractual agreements. Additionally the increased use of refrigerants in the A2L and A3 safety groups may, for the first time, expose these companies

to stringent procedures necessary for full compliance. It is imperative that self-certification is not assumed to be sufficient without a thorough review and assessment against the PED/PE(S)R requirements at the project's outset.

## Summary & Conclusions

The current UK pressure systems regulations continue to mirror the current, but potentially soon to be replaced, EU legislation. The UK has minimal influence over those EU Regulations in future. The benefits of being a third Country have not yet been fully harnessed and in particular the UK goal setting legislative framework that enables innovation without a changing regulatory landscape or an over reliance on new standards being available to ensure certainty must be considered. The UK's in-service Regulations (PSSR) are well established and generally understood, although examples of opportunities for improvement exist.

## About the authors

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David Paget is an expert in refrigeration safety and pressure systems, with over 25 years of experience in pressure vessel and packaged equipment manufacturing, and 12 years as a conformity inspection and in-service surveyor. He currently serves as Chair of the IoR Technical Committee and Chair of the BSI Committee RHE/18 on Refrigeration Safety. In recognition of his contributions to the industry, he was awarded the prestigious Alan Moor Award in 2023.

### Simon Emeny FIMechE

Simon Emeny is a Fellow of the IMechE with 33 years of experience in conformity assessment of mechanical and electrical equipment, systems, and projects. With 20 years dedicated to writing guidelines for the Pressure Equipment Directive (PED) at EU groups, he is a recognised expert in the field. He currently serves as Vice Chair of the IMechE Technical Strategy Board and the IMechE Pressure Systems Group, and he's a Project Director for HPC & SZC ITPIA.